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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Appeal to the Board of Patent Appeals and Interferences

PATENT APPLICATION

In re PATENT APPLICATION of
Inventor(s): SCHUEHMACHER et al.
Appln. No.: 09 (Series Code ↑) | 987,202 (Serial No.) Group Art Unit: 3611
Examiner.: Luby, Matthew D.
Atty. Dkt. P 284108 (M#) | RP-00296-US2 (Client Ref)
Filed: November 13, 2001
Title: A SNOWMOBILE WITH A TURBOCHARGED FOUR-STROKE ENGINE

Date: August 27, 2003

Mail Stop Appeal Brief-Patents
Hon. Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

1. ☐ **NOTICE OF APPEAL**: Applicant hereby appeals to the Board of Patent Appeals and Interferences from the decision (not Advisory Action) dated _____ of the Examiner twice/finally rejecting claim(s) in this application or in this application and its parent application.
2. ☒ **BRIEF** on appeal in this application attached in triplicate (extendable up to 5 months).
3. ☐ An **ORAL HEARING** is respectfully requested under Rule 194 (due two months after Examiner's Answer- unextendable)
4. ☐ Reply Brief is attached in triplicate (due two months after Examiner's Answer – unextendable).
5. ☐ "Small entity" statement filed: ☐ herewith. ☐ previously.

6. ☐ Fee NOT required because paid in prior appeal in which the Board of Patent Appeals and Interferences did not render a decision on the merits (35 USC 134).

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requisite fee is attached.	(3 mos) $930/$465			117/217
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re PATENT APPLICATION of: Confirmation No.: 6169

SCHUEHMACHER et al. Group Art Unit: 3611

Appln. No.: 09/987,202 Examiner: Luby, Matthew D.

Filed: November 13, 2001

Title: A SNOWMOBILE WITH A TURBOCHARGED FOUR-STROKE ENGINE

BRIEF ON APPEAL

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Date: August 27, 2003

OIPE JC125 AUG 27 2003 PATENT & TRADEMARK OFFICE

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I. INTRODUCTION

This Appeal is from an Office Action dated March 26, 2003, finally rejecting claims 1-30 of the above-identified patent application.

A. Real Party in Interest

The real party in interest for this Appeal and the present application is Bombardier Inc., by way of an Assignment recorded in the U.S. Patent and Trademark Office at Reel/Frame 012611/0581.

B. Statement of Related Appeals and Interferences

There are presently no appeals or interferences known to Appellants, the Appellants' representatives or the Assignee, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

C. Status of Claims

Claims 1-30 are pending, stand rejected, and are on appeal. The claims on appeal are set forth in the attached Appendix A. Claim 1 is independent. Claims 2-30 depend directly or indirectly from claim 1.

D. Status of Amendments

An Amendment under 37 C.F.R. §1.111 was filed February 7, 2003 in response to the November 8, 2002 Office Action. All claims amendments have been entered of record.

II. SUMMARY OF THE INVENTION

A. Related Art Problems Overcome by the Invention

Snowmobiles have traditionally used two-stroke engines for power generation. Two-stroke engines are relatively simple, easily integrated with other systems of the snowmobile and provide high power-to-weight and power-to-size ratios. (Page 1, paragraph [0002].)

Relative to two-stroke engines, four-stroke engines have lower power-to-weight/size ratios than two-stroke engines. Since snowmobile performance is extremely sensitive to increases in weight and the relatively compact chassis and body of a snowmobile limits the space available for the engine, four-stroke engines have not been widely used on snowmobiles. Also, four-stroke engines can be difficult to integrate into vehicles, such as snowmobiles, due to the engine's relative complexity. (Pages 1-2, paragraph [0004].)

While two-stroke engines offer the advantage of a higher power-to-weight ratio (and/or a higher power-to-size ratio) than four-stroke engines, two-stroke engines produce a greater amount of exhaust emissions than four-stroke engines. Recent environmental concerns has resulted in legislation requiring lower exhaust emissions. (Page 1, paragraph [0003].)

One way to achieve a higher power-to-weight ratio (or a higher power-to-size ratio) is to turbocharge a four-stroke engine. Outside of the snowmobile art, turbocharger technology is well-known to increase the power output and fuel efficiency of a four-stroke engine. Despite this recognition, a turbocharged four-stroke has not been considered feasible for use on a snowmobile. (page 2, paragraph [0005].)

B. Objects of the Invention

It is an object of the present invention to provide a snowmobile including a frame, an engine, an endless belt drive system and an air intake system for enhancing performance of the engine. The engine is a four-stroke engine with at least one cylinder arranged in an inline or V-twin configuration. (Page 2, paragraphs [0006] and [0007].)

The air intake system includes an air box communicating with the atmosphere and a turbocharger connected to the air box. (Page 2, paragraph [0008].)

It is another object of the invention to provide a heat exchanger connected to the turbocharger to dissipate heat added to the air pressurized by the turbocharger. (Page 3, lines 6-11.)

It is also an object of the invention to provide a plenum connected to the heat exchanger to moderate the pressurization amplitude of the air from the turbocharger. (Page 3, lines 11-16.)

C. Embodiments of the Invention

1. Embodiment 1 of the Invention

Referring to Figure 1, a snowmobile 10 includes a tunnel or frame 12, a steering assembly 14, and an endless belt drive system 16 mounted to an aft portion of the frame 12. An engine 100 is operatively connected to the belt drive system 16. The engine 100 is preferably a four-stroke type internal combustion engine. (Page 5, paragraphs [0025] and [0026].)

Referring to Figure 2, an air intake system 22 includes an air box or passage 200. Air from the atmosphere enters the air box 200 at A. The air flows through the air box 200 and enters a turbocharger 300 at B. The turbocharger 300 rapidly pressurizes the air which also heats the air at the same time. The air exits the turbocharger 300 at C and enters a heat exchanger, or intercooler, 400 at an entrance D. The heat exchanger 400 removes the heat from the pressurized air so that the air temperature is lower at exit E. (Pages 5-6, paragraph [0027].)

Not only does the turbocharger 300 heat the air, it also adds a pulsed amplitude signature to the air. To minimize the effect of the pulsed signature, the air exits the heat exchanger 400 at E and flows into plenum 500 at entrance F. The plenum 500 significantly

reduces the amplitude of the air's pulsed signature. The pressurized air exits the plenum 500 at the exit G and enters the engine 100 at entrance H.

The air is mixed with fuel and combusted, creating exhaust gases that exist the engine 100 at I and enter the turbocharger 300 at J. The exhaust gases passing through the turbocharger 300 affect the compression of the air entering the turbocharger at B. The exhaust gases also introduce the pulsed nature of the pressurized air exiting the turbocharger at C. The exhaust gases then exit the turbocharger 300 at K and exit the snowmobile through an exhaust system 24 (see, e.g., Figure 3). (Page 5, paragraph [0027].)

Referring to Figure 3, the air box 200 is mounted to a forward portion 26 (Figure 1) of the snowmobile 10. The air box 200 is forward of and adjacent to the engine 100. The turbocharger 300 is on a right side of the engine 100 and the heat exchanger 400 is at the forward end 26 of the snowmobile 10 beneath the air box 200. The plenum 500 is on a left side of the engine 100 and operatively connected to the engine 100. (Pages 6-7, paragraph [0028].)

Referring still to Figure 3, the air box 200 is hollow and includes an inlet 202 that communicates with the atmosphere. One or more interior walls 204 divide the interior of the air box 200 into two or more chambers 205A and 205B. The chambers are interconnected by baffles 206 such that air flows through the inlet 202, through the baffles 206, and exits the air box 200 through an outlet 208. The baffle 206 is a tubular member that protrudes through the interior wall 204 and provides an air path 207. The baffle 206 reduces intake roar of the engine 100 and minimize flow resistance of the air as it travels through the air box 200. The inlet side of each baffle 206 includes a flared portion 209 that reduces flow resistance through the baffle 206. A duct member 210 extends from the outlet 208 of the air box to the turbocharger 300. (Pages 7 and 8, paragraph [0029].)

Referring to Figure 4, an inlet opening 211 is formed in an upward portion 28 of the snowmobile 10. The inlet opening 211 is connected to the inlet 202 of the air box 200 by a heat-shielded duct 213. By placing the inlet opening 211 on the upward portion 28, the coolest air possible is allowed to enter the inlet 202. Moreover, the heat-shielded duct 213 allows cool atmospheric air to travel from the inlet opening 211 to the inlet 202 of the air box 200 without absorbing heat from the engine 100 and exhaust system 24. Also, placing the inlet opening 211 on the upward portion 28 presents the intake of snow into the air box 200. (Page 8, paragraph [0030].)

Referring again to Figure 3, the turbocharger 300 is connected to the outlet 208 of the air box 200 by a conduit 210. The conduit 210 may include one or more bends to accommodate positioning of various engine or snowmobiles components and the relative positions of the outlet 208 and the turbocharger 300. The conduit 210 is resistant to high-heat environments. (Pages 8-9, paragraph [0031].) The turbocharger 300 includes a compressor portion 302 and a turbine portion 304. The compressor portion 302 has an inlet 306 connected to the conduit 210 and an outlet 308 connected to a duct or conduit 310. Turbine portion 304 includes an inlet 312 and an outlet 314. The turbocharger 300 utilizes exhaust gas from the engine 100 to compress (pressurize) atmospheric air. (Pages 9-10, paragraph [0033].)

Referring to Figure 6, the turbocharger 300 includes a turbine structure 316 connected to a compressor structure 318. The turbine structure 316 and the compressor structure 318 may be integral with each other or may be separate structures linked by a shaft. A turbine housing 320 directs exhaust gas from the engine 100 tangentially onto the turbine structure 316 to rapidly rotate the turbine structure 316. The exhaust gases are then expelled from the turbine portion 304 through the outlet 314 and flow into the exhaust system 24. As the

turbine structure 316 rotates, the compressor structure 318 rotates within a compressor housing 322 to draw air from the air box 200 into the compressor portion 302. The compressor structure 318 compresses the air within the compressor portion 302 and discharges the pressurized air through the compressor outlet 308. (Page 10, paragraph [0034].)

A waste gate, or bypass valve, 324 is linked to the turbine housing 320 to allow a predetermined volume of exhaust gas to bypass the turbine structure 316. This reduces the pressure output of the turbine portion 302 and decreases the amount of back pressure between the engine 100 and the turbocharger 300. The waste gate 324 may be adjusted to vary the amount of exhaust bypassing the turbine structure 316. It may also be adjusted to vary the performance needs of the engine. (Page 11, paragraph [0035].) The pressurized air exiting the compressor portion 302 includes a larger quantity of oxygen than the same volume of non-pressurized air. The larger volume of oxygen facilitates combustion of a greater amount of fuel. This not only increases the power output-to-fuel input ratio of the engine but also minimizes unburned fuel emissions. However, because the turbine structure 316 is directly linked to the compressor structure 318, the compressor structure 318 induces a cyclical pressurization of the air. This produces a series high amplitude peaks coinciding with the exhaust strokes of the cylinders of the engine 100. A series of low amplitude pressure troughs coincide with the intake, compression and power strokes of the cylinders. (Pages 11-12, paragraph [0036].)

During low speed engine operation, the frequency of the high amplitude pressure peaks is relatively low. If the throttle is rapidly opened, high amplitude pressure peaks generated by increased exhaust pressure lag behind the rapid throttle opening. Thus, there is a delay in the increase of the rotational speed of the turbine structure 316. Subsequently,

increased airflow demands from the engine 100 are not met by the compressor portion 302 and the power increase from the turbocharger 300 is not available. Because the turbine structure 316 may not rotate sufficiently to displace the increased amount of exhaust gases, back pressure may be produced between the engine 100 and the turbine portion 304. This back pressure actually decreases the amount of power the engine 100 generates until the turbine structure 316 spins-up. (Pages 12-13, paragraph [0037].)

Referring again to Figure 3, the compressor outlet 302 communicates with the heat exchanger 400 by a duct or conduit 310. The conduit 310 is connected to an inlet port 401 of the heat exchanger 400 and is preferably formed from a heat resistant material. The conduit 310 is configured to provide a relatively direct air path between the turbocharger 300 and the heat exchanger 400. (Page 13, paragraph [0038].)

The outlet port 405 of the heat exchanger 400 communicates with the plenum 500 via a conduit 414. The conduit 414 is secured to an inlet port 502 of the plenum 500. An outlet port 504 of the plenum communicates with an engine air intake 110. (Page 15, paragraphs [0043] and [0044].)

The volume of the plenum 500 dissipates high pressure peaks entering the plenum 500. The plenum 500 also serves to store relatively high pressure intake air. The engine 100, thus, may ingest air with a relatively constant pressure amplitude. (Page 16, paragraphs [0045] and [0046].)

Referring still to Figure 3, the engine 100 communicates with the plenum 500 at the air intake 110. The air intake 110 is provided by a throttle body 112. The throttle body 112 regulates the amount of air entering the engine 100. The engine 100 has a V-twin configuration including cylinders 102, 104 angularly opposed to each other. Cylinder heads 106, 108 are secured to upper portions of the cylinders 102, 104, respectively. An engine

plenum 114 provides pathways between the throttle body 112 and each cylinder head 106, 108. Pressurized air from the plenum 500 flows through the engine plenum 114 to the intake valves of the combustion chambers. Each cylinder head 106, 108 has an exhaust outlet. Heat-resistance piping 116, shown in Figure 11, is connected to each exhaust outlet. The heat-resistance piping 116 is connected to a connecting structure 118 prior to connection to the turbine inlet 312 of the turbocharger. (Pages 17-18, paragraphs [0048]-[0049].)

Referring to Figure 7, the heat exchanger 400 is located proximate to the forward portion 26 of the snowmobile 10 in a vertical position. Referring to Figure 8, the heat exchanger 400 includes an intake portion 402 providing an inlet port 401 and an outlet portion 404 providing an outlet port 405. The intake and outlet portions 402, 404 are interconnected by a spaced series of elongated conduits 406. Air from the turbocharger 300 enters through the inlet port 401 from conduit 310. The air is directed through the series of conduits 406 toward the outlet port 405. The heat exchanger 400 is formed of a heat conductive material such as metal. The conduits 406 are configured to minimize airflow resistance and pressure loss of the air flowing therein. The spaces 407 between the conduits 406 are sufficiently wide to allow a relatively large amount of air to pass through without producing significant air resistance. Referring still to Figure 7, the heat exchanger 400 may be mounted in a position that is generally normal to the movement of air produced from forward movement of the snowmobile 10. This arrangement directly exposes the conduits 406 to the flow of oncoming air to facilitate heat dissipation. (Pages 13-14, paragraphs [0039]-[0040].

2. Embodiment 2 of the Invention

Referring to Figure 9, the heat exchanger 400 may be mounted parallel to the oncoming air when the snowmobile 10 is moving generally forward. Only a forward edge

408 of the heat exchanger 400 is exposed to the oncoming air. The airflow over the upward side 410 of the heat exchanger 400 produces a low pressure relative to the upward side 410. The pressure differential entrains airflow from below the heat exchanger 400 through the spaces 407 to liberate heat from the conduits 406. A body panel 30 is provided forward of the heat exchanger 400 to protect the heat exchanger 400 from impact with debris. An opening 32 in the panel 30 provides airflow across the upward side 410. The opening 32 may be positioned to provide airflow across a lower side 412 thereby entraining air from the upward side 410 toward the lower side 412 between the conduits 406. (Pages 14-15, paragraph [0041].)

3. Embodiment 3 of the Invention

Referring to Figure 10, the heat exchanger 400 may be disposed at an angle of about 45° relative to the airflow direction. (Page 15, paragraph [0042].)

4. Embodiment 4 of the Invention

Referring to Figure 12, a two-cylinder engine 700 includes a pair of cylinders 702, 704 disposed generally in-line with one another. The engine 700 receives pressurized air from the plenum 500 via an air inlet 706 provided by a throttle body or carburetor. Exhaust outlets 710, 712 of each cylinder 702, 704 are connected to the inlet 312 of the turbocharger 300 by a conduit 714. The conduit 714 includes a branched portion 716 connected to the inlet 312 of the turbine portion 304 of the turbocharger 300. (Pages 18-19, paragraph [0051].)

5. Embodiment 5 of the Invention

Referring to Figure 13, a three-cylinder engine 800 includes three-cylinders 802, 804, 806 disposed generally in-line with one another. The engine 800 receives pressurized air from the plenum 500 via an air inlet 808 provided by a throttle body or carburetor. Exhaust

outlets 812, 814, 816 of each cylinder 802, 804, 806 are connected to the inlet 312 of the turbocharger 300 by a conduit 818. The conduit 818 includes a branched portion 820 connected to the inlet 312 of the turbine portion 304. (Page 19, paragraph [0052].)

6. Embodiment 6 of the Invention

Referring to Figure 15, a continuously variable transmission (CVT) 900 is operatively connected to a crank shaft 902 of an engine 904. The engine 904 may be a V-twin type, a two cylinder type, or a three cylinder type. The CVT 900 is disposed on a side of the engine 904 opposite the turbocharger 300. An engine air intake 906 is arranged at the side of the engine 904 adjacent the CVT 900 and opposite the turbocharger 300. (Pages 21-22, paragraph [0057].)

The use of the CVT on the snowmobile helps reduce or prevent turbo lag caused when the snowmobile is operated in a rapid throttle advancement. The CVT may be configured to delay a driving engagement. The CVT may be engaged at an engine speed (RPM) at which the turbocharger is already effectively pressurizing intake air at an effective and useable level. This relatively high engine RPM prior to driving engagement of the CVT helps minimize turbo lag. (Page 21, paragraph [0057].)

7. Embodiment 7 of the Invention

Referring to Figure 16, a CVT 900 is disposed on a side of the engine 904 adjacent to the turbocharger 300. The engine intake 906 is arranged at the side of the engine 904 opposite to that of the turbocharger 300. The CVT 900 is disposed adjacent to the turbocharger 300 and opposite the intake 906.

8. Arrangements of Embodiments 1, 4 and 5

Referring to Figure 14, the V-twin engine 100, two cylinder engine 700, and three cylinder engine 800 may be selected on the basis of space limitations within the snowmobile 10. Depending on the specific power requirements and space limitations, any one of the engines 100, 700, 800 may be utilized with the snowmobile 10. The width of the two and three cylinder engines 700 and 800 is relatively narrower than that of the V-twin engine 100. However, the length of the V-twin engine 100 is less than either of the two or three cylinder engines 700 or 800. (Pages 20-21, paragraph [0055].)

III. ISSUES AND REJECTIONS

The March 26, 2003 Office Action rejects claims 1, 2, 5, 6, 15-17, 19-21 and 23-30 under 35 U.S.C. §103(a) over Lakosky (U.S. Patent 5,598,065) in view of Applicants' admitted prior art (AAPA) and rejects claims 3, 4, 7-14, 18 and 22 under 35 U.S.C. §103(a) over Lakosky in view of AAPA and Cooper et al. (U.S. Patent 4,698,761).

Thus, the issues on appeal are whether:

(1) Claims 1, 2, 5, 6, 15-17, 19-21 and 23-30 are obvious under 35 U.S.C. §103(a) over Lakosky in view of AAPA; and

(2) Claims 3, 4, 7-14, 18 and 22 are obvious under 35 U.S.C. §103(a) over Lakosky in view of AAPA and Cooper et al.

IV. GROUPING OF CLAIMS

Each claim of this patent application is separately patentable and upon issuance of a patent will be entitled to a separate presumption validity under 35 U.S.C. §282. For convenience in handling of this appeal, the claims are grouped as follows:

Group I, claims 1, 2, 5, 6, 15-17, 19-21 and 23-30; and

Group II, claims 3, 4, 7-14, 18 and 22.

Each of groups I and II will be argued separately in the following arguments. The groups do not stand or fall together. In addition, the claims within each group do not stand or fall together and are argued separately below.

V. ARGUMENT

A. The Law Regarding Factual Inquires to Determine Obviousness/Non-Obviousness

Several basis factual inquires must be made to determine obviousness or non-obviousness of patent application claims under 35 U.S.C. § 103. These factual inquiries are set forth in Graham v. John Deere Co., 383 US 1, 17, 148 USPQ 459, 467 (1966);

> Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or non-obviousness of the subject matter is determined.

As stated by the Federal Court in In re Ochiai, 37 USPQ 2d 1127, 1131 (Fed. Cir. 1995);

> [T]he test of obviousness *vel non* is statutory. It requires that one compare the claim's subject matter as a whole with the prior art to which the subject matter pertains. 35 U.S.C. § 103. The inquiry is thus highly fact-specific by design . . . When the references cited by the Examiner fail to establish a *prima facie* case of obviousness, the rejection is improper and will be overturned. In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988) (Emphasis added).

In rejecting claims under 35 U.S.C. § 103(a), an Examiner bears an initial burden of presenting a *prima facie* case of obviousness. A *prima facie* case of obviousness is established only if there is a suggestion or motivation to combine reference teachings; a reasonable expectation of success; and the prior art references, when combined, teach or suggest all the claim limitations. If an Examiner fails to establish a *prima facie* case, a rejection is improper and will be overturned. See In re Rijckaert, 9 F.3d 1531, 28 USPQ2d 1955 (Fed. Cir. 1993). "If examination . . . does not produce a *prima facie* case of unpatentability, then without more, the Applicant is entitled to the grant of the patent." In re Oetiker, 977 F.2d 1443, 1445-1446, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

B. Rejections Under 35 U.S.C. §103(a)

1. Lakosky

Lakosky discloses a lighting system for snowmobiles. The snowmobile 20 includes a pair of front skis 24, a hood cowl 26, a drive track 28 and associated drive track suspension 30. The cowl 26 houses a typical two or four stroke internal combustion engine.

2. AAPA

Appellants admit that it is known outside the art of snowmobiles to use a turbocharger in conjunction with a four-stroke engine. However, Appellants clearly and unambiguously disclosed that turbocharged V-twin engines have not previously been considered feasible for utilization with a snowmobile. See page 2, paragraph [0005] of the instant application. See also page 5, paragraph [0026] and page 21, paragraphs [0056] and [0057].

Appellants also admit that the use of a continuously-variable-transmission (CVT) is well-known in the art of snowmobiles. However, as discussed above, Appellants have not and do not admit that the use of a CVT with a turbocharged four-stroke engine is known in the art of snowmobiles.

3. Cooper et al.

Cooper et al. disclose an automatic tunnel detector for a diesel-electric locomotive. The detector includes means responsive to the temperatures of the coolant and lubricant of the locomotive engine for automatically indicating that the locomotive is in a tunnel. If the locomotive is determined to be in a tunnel, means are provided for increasing a temperature threshold at which the power output of the generating means is reduced.

Referring to Figure 2, the diesel engine 34 includes a turbocharger comprising a gas turbine 35 and air compressor 36. The gas turbine 35 has an output shaft that drives the centrifugal air compressor 36. Clean air is collected in a plenum (not shown), passed through an array of air filters 37, delivered to a central inlet of the compressor 36, and discharged (at elevated pressure and temperature) through alternative peripheral outlets on opposite sides of the engine 34. The compressed air that is discharged from each of the two outlets passes through an associated air-water heat exchanger 38 and then into a combustion air intake manifold 39. (Figure 2 only shows the heat exchanger 38 and the intake manifold 39 on the near side of the engine and does not show the duplicate heat exchanger and manifold that are conventionally disposed on the far side of the engine.)

From the manifold 39, the compressed air is supplied to a bank of power cylinders 41, 42, 43 on the same side of the engine. The gases produced during combustion are exhausted from each of the cylinders 41, 42, 43 into an exhaust manifold 45 to drive the turbine 35 prior to their discharge through an exhaust stack 46 to the atmosphere.

4. Claim 1 Is Not Obvious Over Lakosky in View of AAPA

Claim 1 recites a snowmobile comprising a frame, an engine, an endless belt drive system, an air intake system for the engine. The frame has a forward portion and an aft portion. The engine is mounted to the forward portion. The belt drive system is mounted to

the aft portion and operatively connected to the engine. The engine is a turbocharged four-stroke type engine.

The March 26, 2003, Office Action on page 2, paragraph number 2, alleges that Lakosky discloses all of Applicants claimed invention, but does not specifically disclose that a turbocharger or CVT is used. The Office Action then alleges that AAPA discloses that it is well known to use a turbocharger in conjunction with a four-stroke engine and a CVT in order to increase power output and efficiency of the engine and to reduce or prevent turbo lag. The Office Action concludes that "It would have been obvious to one of ordinary skill in the art at the time of the invention to provide a turbocharger on the four-stroke engine of Lakosky as taught by AAPA in order to increase power output and fuel efficiency of the engine."

MPEP §2141 states "Patent examiners carry the responsibility of making sure the standard of patentability enunciated by the Supreme Court and by the Congress is applied in each and every case. (Emphasis in original.) MPEP §2141 further states "Office policy is to follow Graham v. John Deere Co. in the consideration and determination of obviousness under 35 U.S.C. §103. As quoted above, the four factual inquires enunciated therein as a background for determining obviousness are as follows: (A) Determining the scope and contents of the prior art; (B) Ascertaining the differences between the prior art and the claims in issue; (C) Resolving the level of ordinary skill in the pertinent art; and (D) Evaluating evidence of secondary considerations."

MPEP §2141 also states "When applying 35 U.S.C. 103, the following tenets of patent law must be adhered to: (A) The claimed invention must be considered as a whole; (B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination; (C) The references must be viewed without the

benefit of impressible hindsight vision afforded by the claimed invention; and (D) Reasonable expectation of success is the standard with which obviousness is determined."

MPEP §2141.02 states "Ascertaining the differences between the prior art and the claims at issue requires interpreting the claim language, and considering both the invention and the prior art references as a whole." MPEP §2141.02 further states "In determining the differences between the prior art and the claims, the question under 35 U.S.C. §103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious." (Emphasis in original.)

It is respectfully submitted that the combination of Lakosky and AAPA fails to present a *prima facie* case of obviousness against claim 1 because there is no suggestion or motivation, other than Appellants', to modify the snowmobile of Lakosky to include a turbocharged four-stroke type engine. It is also respectfully submitted that the Office Action fails to adhere to Patent Office policy by failing to apply the test for patentability under 35 U.S.C. §103 set forth in Graham v. John Deere Co. for the reasons discussed below.

Lakosky states that an object of his invention is to provide a lighting system that may be mounted on any vehicle, particularly commercially available off-road vehicles, and even more particularly, snowmobiles, without requiring significant modification of the vehicle, wherein the lighting system enhances the appearance of the vehicle and the users enjoyment of the vehicle. See column 2, lines 11-17 of Lakosky. Lakosky provides no suggestion or motivation whatsoever to one of ordinary skill in the art to increase the power output and fuel efficiency of an engine of the snowmobile. Lakosky merely discloses that the internal combustion engine may be a typical two or four stroke internal combustion engine.

AAPA discloses that it is known to use a turbocharger in conjunction with a four-stroke engine to increase the power output and fuel efficiency of the engine. See page 2,

paragraph [0005] of the instant application. However, Appellants have clearly stated that turbocharged four-stroke engines have not previously been considered feasible for utilization in snowmobiles. See page 2, paragraph [0005] of the instant application. See also page 21, paragraphs [0056] and [0057] of the instant application.

In the Amendment filed February 7, 2003, Appellants argued that although turbocharged four-stroke engines are known generally, such engines have not been used in the past in snowmobiles. See page 5, last paragraph, of the February 7, 2003 Amendment.

In response to Appellants' arguments, the March 26, 2003, Office Action on page 5, paragraph number 4, states: "What the last Office Action did was to combine these admissions (i.e. that it is well known to use a turbo-charger on a four-stroke engine and a CVT on a snowmobile) with the Lakosky reference already taught a four-stroke engine for a snowmobile. This is all that was required by claim 1 which reads 'said engine being a turbo-charged four-stroke type engine' and claim 19, which reads 'further comprising a continuously-variable-transmission.' Applicants' mere combination of a admittedly well-known turbocharger and a CVT on a 4-stroke engine snowmobile is clearly met by the Lakosky in view of AAPA combination."

It is respectfully submitted that the March 26, 2003 Office Action fails to: (1) determine the scope and content of the prior art; (2) ascertain the differences between the prior art and the claims; (3) resolve the level of ordinary skill in the pertinent art; and (4) evaluate the evidence of secondary considerations of non-obviousness.

MPEP §2141.02 states: "A prior art reference must be considered in its entirety, i.e., as a whole, including portions that will lead away from the claimed invention." (Emphasis in original.) It is respectfully submitted that the Examiner's reliance on Appellants' admission that it is well known to use a turbocharger on a 4-stroke engine fails to consider Appellants'

admissions as a whole. Appellants have admitted that the use of a turbocharger on a 4-stroke engine is known. However, Appellants have also pointed out that the use of a turbocharged four-stroke engine in a snowmobile has been previously considered unfeasible in the art. Appellants have also noted that the use of a turbocharged four-stroke engine in a snowmobile has been unpracticed in the art. The Examiner's reliance on the Appellants' single admission that may lead one of ordinary skill in the art to the claimed invention, while ignoring Appellants' numerous statements that would lead one of ordinary skill away from the claimed invention is clearly a failure to consider the prior art as a whole, as required by MPEP §2141.02.

It is respectfully submitted that the examiner's determination that "Applicants' mere combination of an admittedly well-known turbocharger and CVT on a 4-stroke engine snowmobile is clearly met by the Lakosky in view of AAPA combination" is an improper determination that the differences between the prior art and claim 1 themselves would have been obvious. It is also respectfully submitted that the Examiner has failed to resolve the level of ordinary skill in the art. Appellants have clearly disclosed that the use of a turbocharged four-stroke type engine in a snowmobile has previously been considered unfeasible by those in the art of snowmobiles. The Examiner has not cited any prior art, other than Appellants' admission that turbocharged four-stroke engines are known outside the art of snowmobiles, that teaches or suggests a turbocharged four-stroke type engine in a snowmobile.

It is also respectfully submitted that the Examiner is confusing the requirements for a *prima facie* case of obviousness with the requirements for establishing a *prima facie* case of anticipation. It is respectfully submitted that a *prima facie* case of obviousness cannot be established by simply assembling or combining references or admissions to "meet" or "read

on" the claimed invention. A *prima facie* case of obviousness can only be established where the combination of references discloses all of the claimed limitations and there is some teaching, suggestion or motivation to combine the references. The teaching, suggestion, or motivation must be found, either explicitly or implicitly, in the references themselves or in the knowledge generally available to one of ordinary skill in the art. Lakosky does not teach or suggest anything regarding the use of turbocharger on a four-stroke engine in a snowmobile. AAPA clearly states that the use of a turbocharged four-stroke snowmobile has been previously considered unfeasible in the art and has been unpracticed in the art. The combination of Lakosky and AAPA thus fails to present a *prima facie* case of obviousness.

In addition, the March 26, 2003, Office Action also fails to consider the secondary considerations of non-obviousness, namely, Applicants' disclosures and admissions that use of a turbocharged four-stroke engine in a snowmobile has been previously considered unfeasible and unpracticed in the art. These admissions by Appellants are uncontested by the Examiner.

Appellants have clearly proceeded contrary to the accepted wisdom in the snowmobile art. See MPEP §2145X.3. It is respectfully submitted that the Examiner's refusal to consider this secondary consideration is a failure to follow Patent Office policy in applying the standard of patentability enunciated in Graham v. John Deere Co. in the consideration and determination of obviousness and is, therefore, clearly improper.

In response to Appellants' arguments that there is no suggestion to combine Lakosky and AAPA, the March 26, 2003 Office Action on page 6, lines 18-19, states: "In this case, the motivation comes from Applicants' own admissions in the specification." It is respectfully submitted that the motivation to combine Lakosky and AAPA could not have come from Appellants' admissions as Appellants have clearly disclosed that the use of a turbocharged

four-stroke type engine has been previously considered unfeasible in the snowmobile art. It is further respectfully submitted that Appellants' acknowledgment that certain claimed features are known outside the art of snowmobiles cannot be relied upon to provide the motivation to combine those features with Lakosky. Even assuming that those of ordinary skill in the art of snowmobiles knew of the use of turbocharged four stroke engines, such knowledge can not be relied on to provide the suggestion or motivation to combine Lakosky with AAPA. See MPEP § 2143.01.

5. Claim 2 Is Not Obvious Over Lakosky in View of AAPA

Claim 2 depends from claim 1 and recites that the engine includes at least one cylinder, each cylinder having a respective combustion chamber. The engine has an air inlet capable of communicating with each of the combustion chambers and exhaust outlet capable of communication with each of the combustion chambers. The air intake system comprises an air passage communicated with the atmosphere, the air passage being a substantially hollow enclosed structure. A turbocharger is connected to the air passage such that the air from the air passage may enter the turbocharger. The turbocharger communicates with the exhaust outlet and is constructed and arranged such that a flow of exhaust gases from the exhaust gas outlet through the turbocharger effects a pressurization of air therein.

With respect to claim 2, the March 26, 2003 Office Action on page 2, paragraph 2 states: "Regarding claims 2 and 15-17, all of the limitations recited are inherent properties of an engine and turbocharger."

MPEP §2112 states: "In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." (Emphasis in original.) MPEP §2112 further states: "The fact that a certain result or

characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic." (Emphasis in original.)

Lakosky does not disclose or suggest a snowmobile including a turbocharged four-stroke type engine. It is, therefore, impossible for Lakosky to inherently disclose the limitations of claim 2.

AAPA discloses that turbochargers are known. AAPA, however, does not disclose or suggest an air passage communicated with the atmosphere, the air passage being a substantially hollow enclosed structure and a turbocharger connected to the air passage such that air from the air passage may enter the turbocharger. The Examiner has provided no basis in fact or technical reasoning to reasonably support the determination that the claimed engine and air intake system, including the features recited in claim 2, necessarily flow from the teachings of Lakosky or AAPA. The Office Action is completely silent as to how the claimed engine and air intake system is inherent from the teachings of Lakosky and AAPA. It is respectfully submitted that the Office Action is silent because the engine and air intake system of claim 2 are not inherent in the teachings of Lakosky or AAPA.

As the combination of Lakosky and AAPA fail to disclose all limitations of claim 2, the combination fails to present a *prima facie* case of obviousness against claim 2.

6. Claim 5 Is Not Obvious Over Lakosky in View of AAPA

Claim 5 depends from claim 2 and recites that the air passage is positioned forward of the engine in spaced relation thereto to prevent significant heating of air within the air passage.

With respect to claim 5, the March 26, 2003 Office Action on page 3, lines 9-15 states: "It would have been obvious to one having ordinary skill in the art at the time the

invention was made to put the air passage either fore or aft of the engine, . . . since it has been held that rearranging parts of an invention involves only routine skill in the art." The Office Action than cites In re Japikse, 86 USPQ 70.

As discussed above with respect to claim 2, neither Lakosky nor AAPA discloses, either expressly, implicitly, or inherently, an air intake system comprising an air passage communicated with the atmosphere and connected to the turbocharger. Accordingly, it is unclear how it could have been obvious to one of ordinary skill in the art to rearrange the placement of the air passage when the prior art references relied upon by the Examiner do not even disclose or suggest the claimed air passage.

MPEP §2144.04 states: "If the facts in the prior art legal decision are sufficiently similar to those in an application under examination, the examiner may use the rationale used by the court." MPEP §2144.04 further states: "If the Applicant has demonstrated the criticality of a specific limitation, it would not be appropriate to the rely solely on case law as the rationale to support an obviousness rejection."

As discussed in MPEP §2144.04VI.C., In re Japikse involved claims to a hydraulic power press which read on the prior at except with regard to the position of a starting switch. The claims were held unpatentable because shifting the position of the starting switch would not have modified the operation of the device.

It is respectfully submitted that the facts of the In re Japikse are not sufficiently similar to those in the instant application to support the Examiner's use of the precedent as a source of supporting rationale for a determination of obviousness. As discussed above, the prior art relied upon by the Examiner does not even disclose or suggest the claimed air passage. Additionally, Appellants have demonstrated that the spaced relation prevents significant heating of air within the air passage, which, unlike the facts in In re Japikse, does

modify the operation of the device. Accordingly, the Examiner's reliance on the precedent as the sole rationale to support the obviousness determination is improper under MPEP §2144.04.

As the combination of Lakosky and AAPA fail to disclose other limitations of claim 5, and as there is no motivation or suggestion to modify the references, the combination of Lakosky and AAPA fails to present a *prima facie* case of obviousness against claim 5.

7. Claim 6 Is Not Obvious Over Lakosky in View of AAPA

Claim 6 depends from claim 2 and recites that the air passage is positioned aft of the engine and in spaced relation thereto to prevent a significant heating of air within the air passage.

As discussed above with respect to claim 5, the combination of Lakosky and AAPA fails to disclose or suggest an air passage. The combination, thus, fails to disclose or suggest the claimed spaced relation of the air passage to the engine. The combination also fails to disclose or suggest the claimed aft positioning of the air passage. As also discussed above, the Examiner's reliance on precedent as the sole source of rationale for the determination of obviousness is improper.

As the combination of Lakosky and AAPA fails to disclose all the limitations of claim 6, the combination fails to present a *prima facie* case of obviousness against claim 6.

8. Claim 15 Is Not Obvious Over Lakosky in View of AAPA

Claim 15 depends from claim 2 and recites that the snowmobile further comprises an exhaust system. The exhaust system is operatively connected to the turbocharger such that the exhaust gas may flow from the turbocharger subsequent to affecting the pressurization of air from the environment and through the exhaust system into the atmosphere.

The Office Action once again relies on theory of inherency to reject claim 15 without providing a basis in fact or technical reasoning to reasonably support the determination that the claimed limitations necessarily flow from the teachings of Lakosky and AAPA. Lakosky and AAPA do not inherently disclose or suggest an engine and an air intake system as claimed. Lakosky and AAPA do not inherently disclose or suggest an air passage communicated with the atmosphere connected to a turbocharger, the air passage being a substantially hollow enclosed structure connected to a turbocharger such that air from the air passage may enter the turbocharger. Lakosky and AAPA, thus, cannot inherently disclose an exhaust system operatively connected to the turbocharger such that the exhaust gas may flow from the turbocharger subsequent to affecting the pressurization of air from the environment and through the exhaust system into the atmosphere.

As the combination of Lakosky and AAPA fails to disclose all the claim limitations, the combination fails to present a *prima facie* case of obviousness agains claim 15.

9. Claim 16 Is Not Obvious Over Lakosky in View of AAPA

Claim 16 depends from claim 14 and recites that the exhaust system includes a muffler to dissipate noise of the exhaust gas exiting the engine.

The Examiner again relies on the theory of inherency to reject claim 16 without providing a basis in fact or technical reasoning to support the determination that the claimed limitations necessarily flow from the teachings of Lakosky and AAPA. Lakosky and AAPA do not inherently disclose or suggest the engine, the air intake system, and the exhaust system of claim 16. As the combination of Lakosky and AAPA fails the disclose all the claim limitations, the combination fails to present a *prima facie* case of obviousness against claim 16.

10. Claim 17 Is Not Obvious Over Lakosky in View of AAPA

Claim 17 depends from claim 2 and recites that the air inlet is provided by a throttle body.

The Examiner again relies on the theory of inherency to reject claim 17 without providing a basis in fact or technical reasoning to support the determination that the claimed limitation necessarily flows from the teachings of Lakosky and AAPA. As discussed above with respect to claim 2, Lakosky and AAPA do not inherently disclose the claimed engine and air intake system. The combination of Lakosky and AAPA, therefore, cannot inherently disclose or suggest that the claimed air inlet is provided by a throttle body.

As the combination of Lakosky and AAPA fails to include all the limitations of claim 17, the combination fails to present a *prima facie* case of obviousness against claim 17.

11. Claim 19 Is Not Obvious Over Lakosky in View of AAPA

Claim 19 depends from claim 1 and recites that the snowmobile further comprises a continuously-variable-transmission (CVT). The CVT is operatively coupled between the engine and the endless belt drive system and is manipulable into an engaged configuration. In the engaged configuration, the CVT transfers sufficient power between the engine and the belt drive system to effect initial movement of the snowmobile.

The March 26, 2003 Office Action on page 2, paragraph number 2, alleges that it would have been obvious to one of ordinary skill in the art to provide a continuously-variable-transmission (CVT) to the snowmobile of Lakosky to reduce or prevent turbo lag.

It is respectfully submitted that the Examiner has again failed to follow Patent Office policy in applying the standard of patentability set forth in Graham v. John Deere Co. in the consideration and determination of obviousness under 35 U.S.C. §103. The Examiner has

failed to determine the scope and content of the prior art by failing to consider Applicants' admissions as a whole. Although Applicants have admitted that the use of CVTs is known in the art of snowmobiles and that a CVT may help reduce or prevent turbo lag, Applicants have also disclosed that the claimed combination of a four-stroke turbocharged engine and a CVT in a snowmobile has been unpracticed in the art. The Examiner has improperly failed to consider these disclosures or admissions and has failed to ascertain the differences between the prior art and the claim by improperly focusing on the differences themselves, as opposed to the differences between the prior art and the claimed invention as a whole.

It is also respectfully submitted that the Examiner has failed to evaluate the evidence of secondary considerations presented by Appellants, namely, that the use of the a turbocharged four-stroke engine and CVT in a snowmobile has been unpracticed in the art and that Appellants have proceeded contrary to the accepted wisdom in the art.

It is further respectfully submitted that the Examiner has failed to present a *prima facie* case of obviousness as there is no teaching, suggestion or motivation in either Lakosky or AAPA to combine the references as alleged in the Office Action. The Examiner's reliance on Appellants' admissions that turbocharged four-stroke engines are known outside the art of snowmobiles as the motivation or suggestion to combine the references is improper as the motivation could not have come from Appellants. Appellants have clearly disclosed that the use of a turbocharged four-stroke type engine has been previously considered unfeasible in the snowmobile art. This admission, when considered as a whole with Appellants' other admissions and statements, would lead one of ordinary skill away from the claimed invention. Even assuming that those of ordinary skill in the art of snowmobiles knew of the use continuously-variable-transmissions, such knowledge can not be relied on to provide the suggestion or motivation to combine. See MPEP § 2143.01.

12. Claim 20 Is Not Obvious Over Lakosky in View of AAPA

Claim 20 depends from claim 19 and recites that the continuously-variable-transmission is operatively connected to the engine on a side thereof opposite a side thereof that is proximate the turbocharger.

As disclosed, for example, on page 22, paragraph [0058] of the instant application, the CVT, the engine, and the turbocharger may be arranged so as to maximize available space within the snowmobile. See also, for example, Figure 15.

In rejecting claim 20, the Examiner again relies on the rationale set forth in In re Japikse. However, it is respectfully submitted that the facts of In re Japikse are not sufficiently similar to those in the instant application to permit the Examiner to rely on the rationale used by the court in that case. Appellants have demonstrated the claimed arrangement maximizes available space with the snowmobile. The Examiner's reliance solely on the rationale of In re Japikse in the determination of obviousness is, therefore, improper under MPEP §2144.

As the combination of Lakosky in view of AAPA fails to disclose all the limitations of claim 20, the combination fails to present a *prima facie* case of obviousness against claim 20.

13. Claim 21 Is Not Obvious Over Lakosky in View of AAPA

Claim 21 depends from claim 19 and recites that the continuously-variable-transmission is operatively connected to the engine on a side thereof opposite a side thereof that is proximate the turbocharger.

As disclosed, for example, on page 22, paragraph [0058] of the instant application, the CVT, the engine, and the turbocharger may be arranged so as to maximize available space within the snowmobile. See also, for example, Figure 16.

It is respectfully submitted that the facts of In re Japikse are not sufficiently similar to those in the instant application to permit the Examiner to rely on the rationale used by the court. Also, Appellants have demonstrated the claimed arrangement maximizes the available space and the Examiner's reliance solely on that rationale is improper under MPEP §2144.

As the combination of Lakosky in view of AAPA fails to disclose all the limitations of claim 20, the combination fails to present a *prima facie* case of obviousness.

14. Claim 23 Is Not Obvious Over Lakosky in View of AAPA

Claims 23 depends from claim 19 and recites that the turbocharger pressurizes the air prior to engagement of the continuously-variable-transmission.

The Office Action does not identify any portion of Lakosky or AAPA that discloses that the turbocharger pressurizes the air prior to engagement of the CVT. It is respectfully submitted that neither Lakosky nor AAPA discloses this claim limitation. As neither Lakosky nor AAPA disclose or suggest this limitation, the combination of Lakosky and AAPA fails to include all the limitations of claim 23. As the combination fails to include all the claim limitations it fails to present a *prima facie* case of obviousness against claim 23.

15. Claim 24 Is Not Obvious Over Lakosky in View of AAPA

Claim 24 depends from claim 1 and recites that the engine is of a V-twin two cylinder type engine.

The March 26, 2003 Office Action does not identify any portion of Lakosky or AAPA that discloses that the engine is of a V-twin two cylinder type engine. It is respectfully

submitted that neither Lakosky nor AAPA disclose or suggest this limitation. Lakosky merely discloses that the cowl houses a typical two or four stroke internal combustion engine, but does not disclose or suggest that the engine is a V-twin two cylinder type engine. As the combination of Lakosky and AAPA fails to disclose or suggest this limitation, the combination fails to present a *prima facie* case of obviousness against claim 24.

16. Claim 25 Is Not Obvious Over Lakosky in View of AAPA

Claim 25 depends from claim 1 and recites that the engine includes a plurality of cylinders and is an in-line type engine.

The March 26, 2003 Office Action does not identify any portion of Lakosky or AAPA that discloses that the engine includes a plurality of cylinders in an in-line type engine. It is respectfully submitted that neither Lakosky nor AAPA disclose or suggest this feature. Lakosky's mere disclosure of a typical two or four stroke engine is not a disclosure of a in-line engine having a plurality of cylinders. As the combination of Lakosky and AAPA fails to disclose or suggest this limitation, the combination fails to present a *prima facie* case of obviousness against claim 25.

17. Claim 26 Is Not Obvious Over Lakosky in View of AAPA

Claim 26 depends from claim 1 and recites that the turbocharger is disposed on a starboard side of the engine.

With respect to claim 26, the March 26, 2003 Office Action alleges that it would have been obvious to one of ordinary skill in the art to put the turbocharger on the starboard side of the engine as an obvious rearrangement of parts. It is respectfully submitted that the Examiner's reliance on In re Japikse is improper as the facts of that precedent are not sufficiently similar to the instant application. Moreover, pages 22-23, paragraph [0058] of the instant application discloses the arrangement of the CVT, the engine, the turbocharger,

the plenum and the other components maximizes available space within the snowmobile 10, thus preventing reliance solely on the rationale used by the court to determine obviousness.

As neither Lakosky nor AAPS discloses or suggests the limitation of claim 26, and as there is no motivation or suggestion in the references to lead one of ordinary skill in the art to combine the references, the combination of Lakosky and AAPA fails to present a *prima facie* case of obviousness against claim 26.

18. Claim 27 Is Not Obvious Over Lakosky in View of AAPA

Claim 27 depends on claim 1 and recites that the turbocharger is disposed on the port side of the engine.

Pages 22-23, paragraph [0058], for example, of the instant application discloses that the CVT, the engine, the turbocharger, the plenum and the other components are arranged so as to maximize available space within the snowmobile 10.

It is respectfully submitted that the Examiner's sole reliance on the rationale used in In re Japikse is improper as the facts of that precedent are not sufficiently similar to the instant application, and Appellants have demonstrated that the claimed arrangement maximizes the available space within the snowmobile.

As neither Lakosky nor AAPA discloses or suggests the limitations of claim 27, and as there is no motivation or suggestion in the references to lead one of ordinary skill in the art to combine the references, the combination of Lakosky and AAPA fails to present a *prima facie* case of obviousness against claim 27.

19. Claim 28 Is Not Obvious Over Lakosky in View of AAPA

Claim 28 depends from claim 19 and recites that the plenum and the continuously-variable-transmission are disposed on the same side of the engine.

It is respectfully submitted that the facts of In re Japikse are not sufficiently similar to the instant application and that Appellants have demonstrated that the claimed limitation maximizes the available space within the snowmobile, for example, on page 22, paragraph [0058] of the instant application. The Examiner's reliance on the rationale used by the court is, therefore, improper under MPEP §2144.04.

As neither Lakosky nor AAPA discloses or suggests the limitations of claim 28 and as there is no motivation or suggestion in the references to lead one of ordinary skill in the art to combine the references, the combination of Lakosky and AAPA fails to present a *prima facie* case of obviousness against claim 28.

20. Claim 29 Is Not Obvious Over Lakosky in View of AAPA

Claim 29 depends from claim 19 and recites that the plenum and the continuously-variable-transmission are disposed on opposite sides of the engine relative to each other.

It is respectfully submitted that the Examiner's reliance on In re Japikse is improper as the facts of that precedent are not sufficiently similar to the instant application and because Appellants have demonstrated that the claimed arrangement maximizes the available space within the snowmobile, for example, on page 22, paragraph [0058].

As neither Lakosky nor AAPA discloses or suggests the claimed limitation and as there is no motivation or suggestion in the references to lead one of ordinary skill in the art to combine the references, the combination of Lakosky and AAPA fails to present a *prima facie* case of obviousness against claim 29.

21. Claim 30 Is Not Obvious Over Lakosky in View of AAPA

Claim 30 depends from claim 4 and recites that the plenum and the turbocharger are disposed on opposite sides of the engine relative to one another.

It is respectfully submitted that the facts of In re Japikse are not sufficiently similar to the instant application. It is also respectfully submitted that Appellants have demonstrated that the claimed arrangement maximizes the available space, for example, on page 22, paragraph [0058]. The Examiner, thus, may not rely on the rationale used by the court as the sole basis for determining obviousness.

As neither Lakosky nor AAPA discloses or suggests the limitations of claim 30 and as there is no motivation or suggestion in the references to lead one of ordinary skill in the art to combine the references, the combination of Lakosky and AAPA fails to present a *prima facie* case of obviousness against claim 30.

22. Claim 3 Is Not Obvious Over Lakosky in View of AAPA and Cooper et al.

Claim 3 depends from 2 and recites that the snowmobile further comprises a heat exchanger formed of a heat conductive material. The heat exchanger is connected to the turbocharger such that the pressurized air from the turbocharger may enter therein. The heat exchanger is constructed and arranged such that heat from the pressurized air is dissipated to the atmosphere via the heat conductive material.

It is respectfully submitted that the combination of Lakosky, AAPA and Cooper et al. fails to disclose all the limitations of claim 3. In particular, it is respectfully submitted that the combination fails to disclose a heat exchanger formed of heat conductive material connected to the turbocharger. Cooper et al. clearly discloses that the heat exchange medium of the heat exchanger 38 is water. It is respectfully submitted that the heat exchanger 38 of Cooper et al. is constructed and arranged such that heat from the pressurized air is dissipated therefrom to the water of the heat exchanger, not to the atmosphere via heat conductive material of the heat exchanger 38. Therefore, the combination of Lakosky, AAPA and

Cooper et al. fails to disclose all the claimed limitations, and, as a result, fails to present a *prima facie* case of obviousness against claim 3.

It is also respectfully submitted that there is no motivation or suggestion to combine Lakosky, AAPA and Cooper et al. Cooper et al. are concerned with detecting when a diesel locomotive is in a tunnel to increase a temperature threshold at which the power output of the engine is reduced. One of ordinary skill in the art would not find any suggestion or motivation in the disclosure of Cooper et al. to provide a heat exchanger connected to a turbocharger and a plenum connected to the heat exchanger. One of ordinary skill in the art of snowmobiles would not look to diesel locomotive engines for suggestions on how to arrange a four-stroke turbocharged type engine in the relatively compact engine space of a snowmobile. It is respectfully submitted that Cooper et al. are not analogous prior art as they are not from Appellants' field of endeavor, nor are they concerned with the particular problems faced by Appellants. See MPEP § 2141.01(a).

23. Claim 4 Is Not Obvious Over Lakosky in View of AAPA and Cooper et al.

Claim 4 depends from claim 3 and recites that the snowmobile further comprises a plenum connected to the heat exchanger. The plenum is connected to the heat exchanger such that air from the heat exchanger may enter the plenum. The plenum further is connected to the air inlet and is constructed and arranged such that the cyclically pressurized amplitude of air from the turbocharger via the heat exchanger may collect therein. The pressurization amplitude of the air upon exiting the plenum and entering the air inlet is thus substantially constant.

Cooper et al. do not disclose a plenum connected to a heat exchanger as recited in claim 4. As clearly disclosed in column 7, lines 58-60 of Cooper et al., air is collected in the plenum, passed through an array of air filters 37, and then delivered to the compressor 36 of

the turbocharger. The compressed air is then discharged to the heat exchanger 38. The plenum disclosed by Cooper et al. is thus placed prior to the air filters 37. The plenum is not connected to the heat exchanger 38. (See also Figure 2 of Cooper et al. in which it is clearly shown that the air from the heat exchanger 38 passes directly into the manifold 39 without entering a plenum.) As the air is supplied directly from the air compressor 36 through the heat exchanger 38 to the intake manifold 39, the pressurization amplitude of the air entering the intake manifold 39 cannot be substantially constant.

As the combination of Lakosky, AAPA and Cooper et al. fails to disclose all the limitations of claim 4, the combination fails to present a *prima facie* case of obviousness against claim 4.

24. Claim 7 Is Not Obvious Over Lakosky in View of AAPA and Cooper et al.

Claim 7 depends from claim 3 and recites that the heat exchanger is an intercooler. The intercooler includes an intake portion and an outlet portion. The intake and outlet portions are connected by a series of spaced hollow conduits.

With respect to claim 7, the March 26, 2003 Office Action on page 4, lines 9-10 alleges that it is inherent that an intercooler has an inlet and outlet connected by conduits. The Office Action, however, fails to present any basis in fact and/or technical reasoning to support the determination that the intercooler of Cooper et al. necessarily includes a series of spaced hollow conduits. It is respectfully submitted that Cooper et al. do not inherently disclose a series of spaced hollow conduits. Cooper et al. merely disclose that the heat exchanger 38 is an air-water heat exchanger.

As the combination of Lakosky, AAPA and Cooper et al. fails to disclose all the limitations of claim 7, the combination fails to present a *prima facie* case of obviousness against claim 7.

25. Claim 8 Is Not Obvious Over Lakosky in View of AAPA and Cooper et al.

Claim 8 depends from claim 7 and recites that the intercooler is positioned proximate the forward portion of the frame. The intercooler is arranged generally normally to the oncoming airflow from the atmosphere produced by movement of the snowmobile. The conduits are directly exposed to the oncoming air.

With respect to claim 8, the March 26, 2003 Office Action on page 4, lines 11-15 alleges that it would have been obvious to one of ordinary skill in the art to arrange the intercooler of Cooper et al. normally, parallel or at an angle to the oncoming airflow, since it has been held that rearranging parts of an invention involves only routine skill in the art. The Office Action cites In re Japiske.

It is respectfully submitted that the facts of In re Japiske are not sufficiently similar to the instant application to permit the Examiner to rely on the rationale used by the court. In addition, as Applicants have clearly demonstrated that the claimed positioning of the intercooler facilitates heat dissipation, for example, on page 14, paragraph [0040], the Examiner is not permitted to rely on the decision of the court as the sole basis to support the obviousness determination.

As the combination of Lakosky, AAPA and Cooper et al. fails to disclose all the limitations of claim 8, the combination fails to present a *prima facie* case of obviousness against claim 8.

26. Claim 9 Is Not Obvious Over Lakosky in View of AAPA and Cooper et al.

Claim 9 depends from claim 7 and recites that the intercooler is positioned proximate the forward portion of the frame. The intercooler is arranged generally parallel to the oncoming airflow produced by movement of the snowmobile. The intercooler is positioned such that the air is directed across one surface thereof, thereby entraining air from an opposite side through spaces between the conduits.

As discussed in connection with other rejection of the claims, it is respectfully submitted that the facts of In re Japiske are not sufficiently similar to the instant application to justify reliance on that product. It is also respectfully submitted that Appellants have clearly demonstrated that the positioning of the intercooler parallel to the oncoming airflow entrains air to liberate heat from the conduits, for example, on pages 14-15, paragraph [0041]. Therefore, the Examiner is not permitted to rely on In re Japiske as the sole basis to support the obviousness determination.

As the combination of Lakosky, AAPA and Cooper et al. fails to disclose all the claim limitations of claim 9, the combination fails to present a *prima facie* case of obviousness against claim 9.

27. Claim 10 Is Not Obvious Over Lakosky in View of AAPA and Cooper et al.

Claim 10 depends from claim 7 and recites that the intercooler is positioned proximate to the forward portion of the frame. The intercooler is arranged at an angle to the oncoming airflow produced by movement of the snowmobile. The intercooler is positioned such that the air is directed across one surface thereof, thereby entraining air from an opposite side through spaces between the conduits.

It is respectfully submitted that the facts of In re Japiske are not sufficiently similar to the instant application to permit the Examiner to rely on the rationale used by the court. In addition, as Applicants have clearly demonstrated that the claimed positioning of the intercooler entrains air and liberates heat from the conduits, for example, on page 15, paragraphs [0041] and [0042]. The Examiner, therefore, is not permitted to rely on the rationale used by the court as the sole basis to support the obviousness determination.

As the combination of Lakosky, AAPA and Cooper et al. fails to disclose all the claim limitations, the combination fails to present a *prima facie* case of obviousness against claim 10.

28. Claim 11 Is Not Obvious Over Lakosky in View of AAPA and Cooper et al.

Claim 11 depends from claim 3 and recites that the air passage communicates with the turbocharger via a first duct member. The turbocharger communicates with the heat exchanger via a second duct member.

With respect to claim 11, the March 26, 2003 Office Action on page 4, lines 1-3, alleges that Cooper et al. inherently disclose a duct connecting a heat exchanger and a turbocharger and a duct connecting a plenum and a heat exchanger. It is respectfully noted, however, that the Examiner has again failed to provide a basis in fact and/or technical reasoning to support the determination that these limitations necessarily flow from the teachings of Cooper et al.

In fact, as discussed above with respect to claim 4, Cooper et al. do not disclose or suggest a heat exchanger connected to a plenum. The heat exchanger 38 of Cooper et al. is connected directly to the intake manifold 39. Accordingly, it is respectfully submitted that Cooper et al. do not inherently disclose a duct connecting a plenum and a heat exchanger.

As the combination of Lakosky, AAPA and Cooper et al. fail to disclose all the limitations of claim 11, the combination fails to present a *prima facie* case of obviousness against claim 11.

29. Claim 12 Is Not Obvious Over Lakosky in View of AAPA and Cooper et al.

Claim 12 depends from claim 4 and recites that the heat exchanger communicates with the plenum via a third duct member. The third duct member is formed of one of a polymer material and a metallic material.

Cooper et al. does not disclose a heat exchanger communicating with a plenum via a duct member formed of one of a polymer material a metallic material. The heat exchanger 38 of Cooper et al. communicates with the air compressor 36 and the intake manifold 39.

As the combination of Lakosky, AAPA and Cooper et al. fails to disclose all the claimed limitations, the combination fails to present a *prima facie* case of obviousness against claim 12.

30. Claim 13 Is Not Obvious Over Lakosky in View of AAPA and Cooper et al.

Claim 13 depends from claim 4 and recites that the plenum is connected to the air inlet on one end thereof.

Cooper et al. do not disclose a plenum connected to an air inlet of an engine at one end thereof. The plenum disclosed by Cooper et al. is positioned prior to the air filters 37, it is not connected to an air inlet of the engine 34.

As the combination of Lakosky, AAPA and Cooper et al. fails to disclose all the claimed limitations, the combination fails to present a *prima facie* case of obviousness against claim 13.

31. Claim 14 Is Not Obvious Over Lakosky in View of AAPA and Cooper et al.

Claim 14 depends from claim 4 and recites and that the plenum has an internal volume between and including 3 and 5 liters.

The March 26, 2003, Office Action on page 4, last paragraph, states "It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the internal volume of the plenum between 3 and 5 liters, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art." The Office Action then cites In re Aller, 105 USPQ 233.

Firstly, as discussed above, Cooper et al. do not disclose a plenum connected to a heat exchanger as claimed. The plenum of Cooper et al. is positioned prior to the air filters 37. The heat exchanger 38 of Cooper et al. is connected to the manifold 39. Accordingly, the applied prior art does not disclose the "general conditions" of claim 14.

Secondly, it is respectfully submitted that the facts of In re Aller are not sufficiently similar to the instant application to permit the Examiner to rely on the rationale used by the court in determining obviousness. In re Aller dealt with a case in which claimed process was performed at a temperature between 40°C and 80°C and an acid concentration between 25% and 70% that was held to be *prima facie* obvious over a reference which disclosed the process performed at a temperature of 100°C and an acid concentration of 10%. See MPEP §2144.05 II.A. The reference thus disclosed at least some values of the temperature and acid concentration.

In contrast, Cooper et al. disclose or suggest nothing about the volume of the plenum. It is also respectfully submitted that one of ordinary skill in the art of snowmobiles would not

be motivated to "routinely experiment or optimize" with the volume of a plenum as the plenum of Cooper et al. is used in a diesel locomotive for a train, not a snowmobile.

Thirdly, it is respectfully noted that a particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of the variable might be characterized as routine experimentation. See MPEP §2144.05II.B. There is no disclosure or suggestion by Cooper et al. that varying the volume of the plenum achieves a recognized result. As discussed above, the plenum of Cooper et al. is positioned prior to the air filters 37 and prior to the air compressor 36 of the turbocharger. Cooper et al. thus do not recognize that the plenum may be constructed and arranged such that the cyclically pressurized amplitude of air from a turbocharger via a heat exchanger may collect in the plenum so that the pressurization amplitude of the air exiting the plenum and entering the air inlet of the engine is substantially constant.

Fourthly, as Applicants have demonstrated, the claimed volume dissipates high pressure peaks, stores relatively high pressure intake air, and provides the engine with intake air with a relatively constant pressure amplitude. The Examiner's reliance on the rationale used by the court in In re Aller as the sole basis to support the obviousness determination, therefore, is clearly improper under MPEP §2144.04.

As the combination of Lakosky, AAPA and Cooper et al. fails to disclose all the claim limitations, and as there is no motivation or suggestion to make the combination, the combination of Lakosky, AAPA and the Cooper et al. fails to present a *prima facie* case of obviousness against claim 14.

32. Claim 18 Is Not Obvious Over Lakosky in View of AAPA and Cooper et al.

Claim 18 depends from claim 2 recites that the turbocharger pressurizes the air at a sufficiently useable level for engine speeds below 3000 revolutions per minute.

With respect to claim 18, the March 26, 2003, Office Action on page 5, lines 1-6, states "It would have been obvious to one having ordinary skill in the art at the time invention was made to make the speed range below 3000 RPM, since it has been held that where the general conditions of a claim are disclosed in a prior art, the discovering the optimum or workable ranges involves only routine skill in the art." The Office Action again improperly relies on the rationale of In re Aller.

There is no disclosure or suggestion by Lakosky, AAPA, or Cooper et al. that the speed of the engine at which the turbocharger pressurizes air to a sufficiently usable level is a result-effective variable. There is no disclosure or suggestion whatsoever by either Lakosky, AAPA, or Cooper et al. of an engine speed below which the turbocharger pressurizes the air at a sufficiently usable level.

Additionally, Appellants have demonstrated the claimed engine speed at which the turbocharger pressurizes the air to a sufficiently useable level prevents turbo lag in snowmobiles upon rapid throttle advancement, for example, on page 21, paragraph [0057], of the instant application. The Examiner's reliance on In re Aller as the sole basis to support the obviousness determination is, therefore, clearly improper under MPEP §2144.04.

It is also respectfully noted Cooper et al. is directed to a turbocharger for a diesel-electric locomotive engine. One of ordinary skill in the art of snowmobiles would find no motivation or suggestion from Cooper et al. to determine the engine speed for a snowmobile at which the turbocharger pressurizes the air to a sufficiently usable level.

As the combination of Lakosky, AAPA and Cooper et al. fails to disclose all the claim limitations, and as there is no motivation or suggestion to combine the references, the combination fails to present a *prima facie* case of obviousness against claim 18.

33. Claim 22 Is Not Obvious Over Lakosky in View of AAPA and Cooper et al.

Claim 22 depends from claim 19 and recites that the continuously-variable-transmission is configured such that the initial movement of the snowmobile is affected when the engine is operating at 3000 revolutions per minute.

There is no disclosure or suggestion by Lakosky, AAPA, or Cooper et al. that the speed of the engine at which the continuously-variable-transmission is configured to affect initial movement of the snowmobile is a result-effective variable. There is no disclosure or suggestion whatsoever by either Lakosky, AAPA, or Cooper et al. of an engine speed at which the continuously-variable-transmission is configured to affect initial movement of a snowmobile.

The facts of In re Aller are not similar to the instant application.

Additionally, Appellants have demonstrated the claimed engine speed allows the turbocharger to effectively pressurize the engine intake air by the time the CVT begins driving engagement, for example, on page 21, paragraph [0057], of the instant application. The Examiner's reliance on In re Aller as the sole basis to support the obviousness determination is, therefore, clearly improper under MPEP §2144.04.

It is also respectfully noted Cooper et al. is directed to a turbocharger for a diesel-electric locomotive engine. One of ordinary skill in the art of snowmobiles would find no motivation or suggestion from Cooper et al. to determine the engine speed for a snowmobile

at which a continuously-variable-transmission is configured to affect initial movement of the snowmobile.

As the combination of Lakosky, AAPA and Cooper et al. fails to disclose all the claim limitations, and as there is no motivation or suggestion to combine the references, the combination fails to present a *prima facie* case of obviousness against claim 22.

VI. CONCLUSION

For at least the reasons discussed above, it is respectfully submitted that the claims 1, 2, 5, 6, 15-17, 19-21 and 23-30 are not obvious under 35 U.S.C. §103(a) over Lakosky in view of AAPA and that claims 3, 4, 7-14, 18 and 22 are not obvious over Lakosky in view of AAPA and Cooper et al.

For the above reasons, Appellants respectfully request this Honorable Board to reverse the rejection of the claims.

Respectfully submitted,
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VII. APPENDIX A (CLAIM LISTING)

1. A snowmobile, comprising:

a frame;

an engine;

an endless belt drive system;

an air intake system for said engine; and

said frame having a forward portion and an aft portion;

wherein said engine being mounted to said forward portion, said belt drive system being mounted to said aft portion and being operatively connected to said engine;

said engine being a turbocharged four-stroke type engine.

2. A snowmobile as in claim 1, wherein said engine includes at least one cylinder, each cylinder having a respective combustion chamber, said engine having an air inlet capable of communicating with each of said combustion chambers and an exhaust outlet capable of communicating with each of said combustion chambers;

said air intake system comprising;

an air passage communicated with the atmosphere, said air passage being a substantially hollow enclosed structure,

a turbocharger connected to said air passage such that air from said air passage may enter said turbocharger, said turbocharger communicating with said exhaust outlet and being constructed and arranged such that a flow of exhaust gases from said exhaust outlet through said turbocharger affects a pressurization of air therein.

3. A snowmobile as in claim 2, further comprising a heat exchanger formed of a heat conductive material connected to said turbocharger such that the pressurized air from said turbocharger may enter therein, said heat exchanger being constructed and arranged such

that heat from the pressurized air is dissipated therefrom to the atmosphere via said heat conductive material.

4. A snowmobile as in claim 3, further comprising a plenum connected to said heat exchanger such that air from said heat exchanger may enter said plenum, said plenum further connected to said air inlet and being constructed and arranged such that cyclically pressurized amplitude of the air from said turbocharger via said heat exchanger may collect therein such that the pressurization amplitude of the air upon exiting the plenum and entering said air inlet is substantially constant.

5. A snowmobile as in claim 2, wherein said air passage is positioned forward of said engine in spaced relation thereto in order to prevent significant heating of air within said air passage.

6. A snowmobile as in claim 2, wherein said air passage is positioned aft of said engine in spaced relation thereto in order to prevent significant heating of air within said air passage.

7. A snowmobile as in claim 3, wherein said heat exchanger is an intercooler, said intercooler including an intake portion and an outlet portion, said intake and outlet portions connected by a series of spaced hollow conduits.

8. A snowmobile as in claim 7, wherein said intercooler is positioned proximate said forward portion of said frame, said intercooler being arranged generally normally to the oncoming air flow from the atmosphere produced by movement of said snowmobile therethrough, such that said conduits are directly exposed to the oncoming air.

9. A snowmobile as in claim 7, wherein said intercooler is positioned proximate said forward portion of said frame, said intercooler being arranged generally parallel to the oncoming air flow from the atmosphere produced by movement of said snowmobile

therethrough, said intercooler being positioned such that the air is directed across one surface thereof, thereby entraining air from an opposite side through spaces between said conduits.

10. A snowmobile as in claim 7, wherein said intercooler is positioned proximate said forward portion of said frame, said intercooler being arranged at an angle to the oncoming air flow from the atmosphere produced by movement of said snowmobile therethrough, said intercooler being positioned such that the air is directed across one surface thereof, thereby entraining air from an opposite side through spaces between said conduits.

11. A snowmobile as in claim 3, wherein said air passage communicates with said turbocharger via a first duct member and said turbocharger communicates with said heat exchanger via a second duct member.

12. A snowmobile as in claim 4, wherein said heat exchanger communicates with said plenum via a third duct member, said third duct member being formed of one of a polymer material and a metallic material.

13. A snowmobile as in claim 4, wherein said plenum is connected to said air inlet on one end thereof.

14. A snowmobile as in claim 4, wherein said plenum has an internal volume between and including 3 and 5 liters.

15. A snowmobile as in claim 2, wherein said snowmobile further comprises an exhaust system, said exhaust system being operatively connected to said turbocharger such that exhaust gas may flow from said turbocharger subsequent to said affecting the pressurization of air from the environment and through said exhaust system into the atmosphere.

16. A snowmobile as in claim 14, wherein said exhaust system includes a muffler to dissipate noise of the exhaust gas exiting said engine.

17. A snowmobile as in claim 2, wherein said air inlet is provided by a throttle body.

18. A snowmobile as in claim 2, wherein said turbocharger pressurizes the air at a sufficiently useable level for engine speeds below 3000 revolutions per minute.

19. A snowmobile as in claim 1, further comprising a continuously-variable-transmission, which is operatively coupled between said engine and said endless belt drive system and being manipulable into an engaged configuration wherein said continuously-variable-transmission transfers sufficient power between said engine and said belt drive system to effect initial movement of said snowmobile.

20. A snowmobile as in claim 19, wherein said continuously-variable-transmission is operatively connected to said engine on a side thereof opposite a side thereof that is proximate said turbocharger.

21. A snowmobile as in claim 19, wherein said continuously-variable-transmission is operatively connected to said engine on a side thereof adjacent a side thereof that is proximate said turbocharger.

22. A snowmobile as in claim 19, wherein said continuously-variable-transmission is configured such that the initial movement of said snowmobile is effected when said engine is operating at 3000 revolutions per minute.

23. A snowmobile as in claim 19, wherein said turbocharger pressurizes the air prior to engagement of said continuously-variable-transmission.

24. A snowmobile as in claim 1, wherein said engine is of a V-twin two cylinder type engine.

25. A snowmobile as in claim 1, wherein said engine includes a plurality of cylinders and is an in-line type engine.

26. A snowmobile as in claim 1, wherein said turbocharger is disposed on a starboard side of said engine.

27. A snowmobile as in claim 1, wherein said turbocharger is disposed on a port side of said engine.

28. A snowmobile as in claim 19, wherein said plenum and said continuously-variable-transmission are disposed on a same side of said engine.

29. A snowmobile as in claim 19, wherein said plenum and said continuously-variable-transmission are disposed on a opposites sides of said engine relative to one another.

30. A snowmobile as in claim 4, wherein said plenum and said turbocharger are disposed on opposite sides of said engine relative to one another.